Original Research Article

Impact of screen time on sleep quality among undergraduate medical students in Patna, Bihar: a cross-sectional study

Animesh Gupta[1]*, Anubhav[2], Apoorva Priyadarshi[2], Navneet Kaur[2], Tanu Priya[2], Nandini Singh[2]

[1]Department of Community Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, India
[2]Netaji Subhas Medical College and Hospital, Bihta, Patna, India

*Correspondence:
Dr. Animesh Gupta,
E-mail: dranimeshgupta1@gmail.com

ABSTRACT

Background: Digital screens have become omnipresent in the lives of young adults, especially medical students, raising concerns about the influence of extended screen exposure on sleep quality. Growing evidence suggests screen time, particularly near bedtime, adversely affects sleep parameters, potentially diminishing cognitive and academic performance. The objective of this study was to assess the association between total screen time and sleep quality among undergraduate medical students in Patna, Bihar, India.
Methods: A cross-sectional study was conducted in June 2025 among 510 undergraduate medical students from seven medical colleges in Patna. Data was collected using a pre-tested, semi-structured Google Forms questionnaire, which included socio-demographic details, screen use patterns, and the Pittsburgh sleep quality index (PSQI) for sleep assessment. Descriptive and inferential statistics were analyzed with statistical package for the social sciences (SPSS) trial version 25.
Results: The mean participant age was 22.4 years; 59.9% were male. Most students reported 2–4 hours (44.9%) followed by 5–8 hours (29.6%) of screen time per day. Only 16.3% reported sleeping more than 7 hours per night. Use of screens within 1 hour before sleep was reported by 46.7% of participants. PSQI scores showed that 68.2% of students experienced poor sleep quality (global PSQI >5). Extended and late-night screen time was significantly associated with higher PSQI scores, indicating poorer sleep.
Conclusion: High levels of screen exposure, especially at night, are associated with significantly reduced sleep quality among medical students. Responsible digital hygiene and structured interventions are crucial to prevent sleep disturbances in this vulnerable population.

Keywords: Screen time, Sleep quality, PSQI, Medical students, Poor sleeper

INTRODUCTION

The rapid advancement of technology and the proliferation of electronic screen media have dramatically transformed entertainment, academic, and social environments worldwide. College students, especially those pursuing medicine, engage with screens for both academic and recreational purposes, often for prolonged and irregular durations. The digitalization trend is accelerating, further amplifying screen usage patterns among students.[1]

Screen time refers to the time spent on digital devices for a variety of activities, including education, social networking, entertainment, gaming, and communication. According to the World Health Organization, it is defined as the passive consumption of screen-based entertainment, predominantly during leisure activities.[2] While all age groups use digital screens, adolescents and young adults are particularly high users, navigating academic pressures, social demands, and increasing internet-based resources.[3]

Compelling evidence links excessive screen exposure—especially before sleep—with circadian disruption, melatonin suppression, and adverse sleep outcomes such as insomnia and poor sleep efficiency. The emission of blue light from screens stimulates the pineal gland, inhibiting melatonin production, and thus interfering with natural sleep-wake cycles. This disruption is most pronounced when screen time occurs during the evening or at bedtime.[2,3]

Sleep is a vital physiological process that ensures optimal cognitive performance, psychological well-being, growth, and homeostasis through hormonal regulation. Poor sleep quality is associated with daytime sleepiness, impaired concentration, mood disturbances, and suboptimal academic achievement.

Medical students are at particular risk due to demanding schedules and high stress, turning to screens for relaxation after long study and clinical hours.[1] It has been seen that adolescents who used electronic media for six or more hours at night had higher odds of unhealthy eating behavior and inadequate sleep hours than those with two hours of use or less.[4,5]

Global and Indian studies have reported substantial links between elevated screen time, poor sleep quality, altered eating behaviors, mental health issues such as anxiety and depression, and negative impacts on academic performance.[1-5] However, research specific to the Bihar region remains sparse, necessitating this focused inquiry. Thus, the current study was planned to assess the association between total screen time and sleep quality among undergraduate medical students in Patna, Bihar, India.

METHODS

Study design

A descriptive, cross-sectional study was employed.

Study population

All undergraduate medical students aged 18 or older who owned a mobile device and studied in the medical college of Patna were eligible. Students unwilling to participate were excluded.

Study period

The study took place in the Department of Community Medicine, NSMCH, Patna from 15th June to 14th July 2025.

Sample size

Based on the 43% prevalence of poor sleep associated with screen time by Baby et al and 10% of precision margin, the sample size calculated as 510, using the formula given.[6]

$$n = Z^2 pq/l^2$$

Sampling technique

Convenience sampling method was employed.

Data collection

After the ethical approval from the institution, the data was collected using convenience semi-structured, pretested questionnaire, which includes socio-demographics details (age, gender, academic year), information on screen uses (duration in hours, purpose, type of device, usage before sleep) and sleep quality - Pittsburgh sleep quality index (PSQI).

The PSQI is a self-rated questionnaire designed to assess sleep quality and disturbances over a one-month period. It was based on seven components likewise, subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction Each component is scored from 0 to 3, where 0 means "no difficulty/least problems" and 3 means "severe difficulty/most problems." Higher is worse. The total scores of seven component provides global PSQI scores which range from 0 to 21, wherein higher scores indicate poor sleep quality.[7]

Statistical analysis

Data was collected in Google Forms and then extracted into a Microsoft Excel sheet. Data was analyzed with using statistical package for the social sciences (SPSS) trial version 25 software. Categorical data was presented as percentages and continuous data was presented as mean with standard deviation Pearson correlation was used to assess the correlation between two continuous variables. Chi-square tests and Pearson co-relation test were used to assess the associations, with $p<0.05$ considered statistically significant.

RESULTS

Total 510 participants were enrolled from different medical colleges of Patna, out of which 304 (59.6%) were males and 206 (40.4%) were females. The mean age of the participant was 22.4 years (range 18–35, SD 2.46). The maximum participants were enrolled in 3rd year of MBBS and almost 100% participants used smartphone (Table 1).
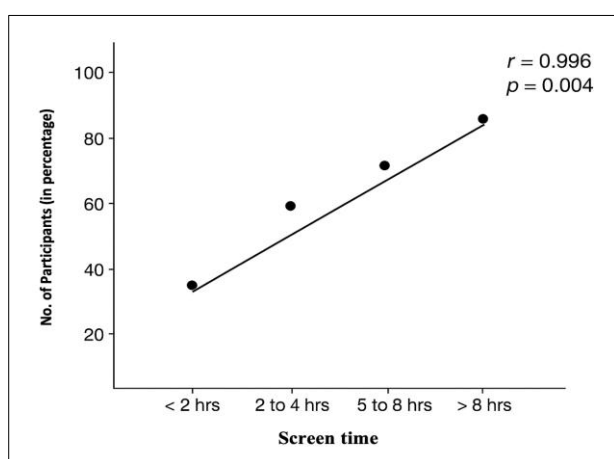
Maximum participants (44.9%) used screens 2–4 hours daily followed by 29.6% used screen for 4–8 hours. The purpose of screen time among participants was mostly for entertainment (60.0%), followed by social media (58.4%) and academics (50.2%). Around 46.7% participants always used electronic gadget (screen time) within one hour before sleep (Table 2).

Table 1: Socio-demographic profile of participants.

Category	Number (%)
Gender	
Male	304 (59.6)
Female	206 (40.4)
Academic year	
1st	108 (21.2)
2nd	157 (30.8)
3rd	176 (34.5)
4th/final	69 (13.5)

Table 2: Screen time usage among participants.

Category	No. (%)
Gadgets used	
Smartphone	510 (100)
Tablet/iPad	329 (64.5)
Laptop	190 (37.3)
Screen time (in hours)	
≤2	78 (15.3)
2–4	229 (44.9)
4–8	151 (29.6)
>8	52 (10.2)
Purpose	
Academics	256 (50.2)
Entertainment	306 (60.0)
Social media	298 (58.4)
Gaming	57 (11.2)
Electronic gadget (screen time) used within one hour before sleep	
Always	238 (46.7)
Sometimes	137 (26.9)
Often	113 (22.1)
Never	22 (4.3)

Figure 1: Relation between screen time duration and poor sleepers.

Based on PSQI, the subjective sleep quality of maximum participants was fairly good (42.1%) and 44.7% participants had sleep latency of 16-30 minutes. The maximum participants had sleep duration of 5-6 hours (39.0%) and sleep latency score of 1-2 (81.7%). Maximum of the participants (68.2%) had global PSQI score more than 5, which denoted as poor sleep (Table 3).

Poor sleep quality increased with higher screen exposure. Around 86.5% participants had poor sleep quality (PSQI >5) with >8 hours of daily screen use, which was statistically significant (Table 4).

Table 3: Sleep behaviour based on PSQI scale among participants.

Domain of sleep quality (PSQI)	No. (%)
Subjective sleep quality	
Fairly good	215 (42.1)
Very good	136 (26.7)
Fairly bad	134 (26.3)
Very bad	25 (4.9)
Sleep latency (min)	
16-30	228 (44.7)
30-60	159 (31.2)
>15	92 (18.0)
>60	31 (6.1)
Sleep duration (in hours)	
≥7	83 (16.3)
6-7	196 (38.4)
5-6	199 (39.0)
<5	32 (6.3)
Sleep disturbances	
No disturbance	56 (11.0)
Mild disturbance	235 (46.1)
Moderate disturbance	199 (39.0)
Severe disturbance	20 (3.9)
Sleep latency score	
0	57 (11.2)
1–2	417 (81.7)
3–4	36 (7.1)
5–6	0 (0.0)
Sleep medication use	
Not during the past month	289 (56.6)
Less than once a week	109 (21.4)
Once or twice a week	84 (16.5)
Three or more times a week	28 (5.5)
Daytime sleep dysfunction	
0	189 (37.0)
1–2	184 (36.1)
3–4	108 (21.2)
5–6	29 (5.7)
Global PSQI	
Good (PSQI ≤5)	162 (31.8)
Poor (PSQI >5)	348 (68.2)

The relationship of average hours of screen time usage and average duration of sleep (hours) during the month was analyzed by Pearson correlation coefficient, which was 0.966 with a p value 0.004.

This signifies a very strong, statistically significant positive correlation between screen time and poor sleep quality (Figure 1).

Table 4: Association of screen time with sleep quality (Global PSQI) among participants.

Screen time (hours)	Good sleepers (PSQI ≤5) No. (%)	Poor sleepers (PSQI >5) No. (%)	Total
<2	36 (46.2)	42 (53.8)	78
2–4	85 (37.1)	144 (62.9)	229
5–8	34 (22.5)	117 (77.5)	151
>8	7 (13.5%)	45 (86.5%)	52

Statistically significant; Chi square test–24.4742, p value=0.00002

DISCUSSION

The present study assessed the association between screen time and sleep quality among undergraduate medical students in Patna using the PSQI. The findings revealed that 68.2% of participants had poor sleep quality (PSQI >5). A significant and strong positive correlation (r=0.996, p=0.004) was observed between screen time duration and poor sleep quality, suggesting that as daily screen exposure increased, the likelihood of poor sleep also rose substantially. Students with more than 8 hours of screen exposure showed the highest prevalence (86.5%) of poor sleep, compared to only 53.8% among those with less than 2 hours of screen time.

These findings are consistent with earlier studies conducted among college students across India. In a metanalysis study by Rao et al, the pooled prevalence of poor sleep quality was reported as 52.7%, which was aligning with the prevalence of this study.[8] Even the prevalence reported by Sahu et al in Bhubaneshwar was also comparable with this study findings.[9]

The current finding, that 46.7% of participants always use electronic devices within an hour before sleep, was comparable with the similar findings by Jain et al in Udaipur.[10]

Studies consistently document that students frequently use smartphones and other electronic gadgets in the evening, leading to delayed sleep onset, increased sleep latency, and reduced sleep duration.[10,11] Gladius et al and Woods observed that late-night use of electronic devices among adolescents was associated with shorter sleep duration, delayed bedtimes, and increased daytime tiredness. Collectively, these studies confirm that prolonged screen exposure, especially before bedtime, disrupts sleep physiology and routine.[12,13]

Sahu et al reported a significant positive correlation between smartphone screen time and sleep duration (Pearson's correlation coefficient of 0.86 and a p value of <0.001), which was similar to this study findings and also

emphasizing that greater exposure to electronic devices adversely affects sleep duration and quality.[6]

Similarly, Baria et al revealed that 79% of medical students had increased screen time and 73% had PSQI >5, indicating poor sleep quality.[14] These results mirror the findings of the present study, where participants with prolonged screen use reported higher levels of sleep disruption. The findings are consistent with the other Indian studies.[15,16] Medical students are burdened by academic demands and using screens to unwind, become especially vulnerable to these sleep disturbances, which may further compromise their mental and physical health. Poor sleep may negatively affect concentration, learning efficiency, emotional regulation and clinical performance.

The strengths of this study include a large sample size, validated sleep instrument (PSQI), and comprehensive assessment of screen behaviours. Some of the limitations of this study were cross-sectional design, which prohibits causality inference and reliance on self-reported data could introduce recall bias.

CONCLUSION

This cross-sectional study highlights a substantial association between extended screen time—especially late at night—and poor sleep quality among undergraduate medical students in Patna, Bihar. Nearly two-thirds of the participants experienced significant sleep issues linked to device use. As future healthcare providers, sustained sleep deprivation may hinder their academic performance and, ultimately, the quality of patient care they provide. There is a need for awareness program promoting responsible screen use, sleep habit practices and behavioural interventions to limit screen exposure before bedtime. Medical colleges should incorporate sleep health education into student wellness initiatives to foster healthier lifestyle habits.

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